IN THE CLAIMS

Please amend the claims as follows:

1. [Currently amended] A method for operating an X-ray source comprising:

emitting an electron beam along a beam path from an emitter of a cathode;

producing a first dipole field between a backing and an aperture defined by said cathode within said electron beam with a differentially biased cathode and immersing~~nteracting~~ said ~~electron beam with said~~ first dipole field and said differential bias within said electron beam to focus and deflect said electron beam onto a focal spot on an anode to cause X-rays to be emitted from said anode; and

modifying said first dipole field with a means for changing the differential bias to shape said electron beam on said anode to effect the focal spot size to produce a predetermined electron beam compression ratio.

2. [Original] The method as claimed in claim 1 comprising selecting said predetermined electron beam compression ratio from among a plurality of settable ratios.

3. [Currently amended] The method as claimed in claim 1 wherein said modifying said first dipole field with a means for changing the differential bias comprises modifying said first dipole field with an independent bias applied to the components of the cathode.

4. [Currently amended] The method as claimed in claim 3 wherein said components of the cathode include saida backing with a bias of Vbacking, said ~~an~~ emitter with a bias of Vemitter, and saidan aperture defined by a cathode front member with a bias of Vaperture.

5. [Currently amended] The method as claimed in claim 4 further comprising ~~wherein~~ Vbacking < Vemitter providinges ~~for a~~ larger beam compression ratio than when Vbacking ≥Vemitter.

6. [Currently amended] The method as claimed in claim 5 further comprising~~wherein gridding is accomplished when~~ Vemitter > Vaperture providing a reverse bias.

7. [Original] The method as claimed in claim 3 wherein a differential voltage between Vbacking and Vaperture is less than about 10kV.

8. [Currently amended] The method as claimed in claim 7 wherein a second ~~the~~ dipole field between said cathode and anode has a beam potential of about 30kV to about 16~~2~~0kV.

9. [Currently amended] The method as claimed in claim 1 further comprising increasing ~~providing a larger~~ an emissive area of said emitter to increase ~~the~~ electron emission relative to an emitter having a circular cross section.

10. [Currently amended] The method as claimed in claim 9 wherein said increasing ~~providing a larger~~an emissive area includes at least one of ~~a straight section into~~ a coiled filament having a substantially planar cross section portion, increasing ~~a~~the length definingof said coiled filament and increasing ~~a~~the diameter definingof said coiled filament.

11. [Currently amended] The method as claimed in claim 1, wherein said focal spot area includes a diameter in the range of about 0.1 mm to about 2 mm. ~~(Remark: 0.1 mm for mammo up to 2 mm for CT)~~

12. [Currently amended] A method to focus high beam currents of electron emission in a cathode assembly opposing an anode and spaced apart therefrom into different sized focal spots in an x-ray tube, the method comprising:

biasing components of the cathode assembly independently, wherein the components include;

an emitter situated therein for emitting an electron beam to a focal spot on the anode during operation of the x-ray tube,

a cathode front member having an aperture defined by the cathode front member on a first side of the emitter, and

a backing disposed on an opposite second side of the emitter and connected to the cathode front member via a backing insulator, wherein the cathode front member and backing are independently biased producing a first dipole field between said backing and said aperture defined by said cathode front member immersing said emitter in said first dipole field within said electron beam to shape and accelerate the electron beam and guide the electron beam to the focal spot on the anode.

13. [Currently amended] The method as claimed in claim 12, further comprising~~wherein~~ said cathode backing havings a bias of Vbacking, said aperture of said cathode front member having a ~~is~~ biased ~~at~~of Vaperture and said emitter having a bias of~~is biased at~~ Vemitter, wherein ~~and~~ Vback < Vemitter providing ~~es for~~ a larger beam compression ratio than when Vback ≥Vemitter.

14. [Currently amended] The method as claimed in claim 13, further comprising~~wherein gridding is accomplished when~~ Vemitter > Vaperture providing a ~~for~~ reverse bias~~ing~~.

15. [Currently amended] An x-ray tube cathode comprising:

a cathode assembly opposing an anode and spaced apart therefrom, the cathode being maintained during operation of the x-ray tube at a negative potential with respect to the anode, the cathode assembly comprising;

an emitter situated therein for emitting an electron beam to a focal spot on the anode during operation of the x-ray tube,

a cathode front member having an aperture defined by the cathode front member on a first side of the emitter,

a backing disposed on an opposite second side of the emitter operably depending form the cathode front member via a backing insulator, wherein the aperture of the cathode front member and backing are independently biased producing a first dipole field between said backing and said aperture defined by said cathode front member immersing said emitter in said first dipole field within said electron beam to shape and accelerate the electron beam and guide the electron beam to the focal spot on the anode.

16. [Currently amended] The x-ray tube as claimed in claim 15, wherein a portion of the emitter is defined with~~has~~ an approximately planar emitting surface.

17. [Original] The x-ray tube as claimed in claim 16, wherein the emitter is a coiled filament.

18. [Original] The x-ray tube as claimed in claim 16, wherein the emitter is one of a ribbon emitter, a dispenser cathode, an e-beam heated emitter and a field emitter.

19. [Canceled]

20. [Currently amended] The x-ray tube as claimed in claim 15 wherein a potential difference between said backing and said aperture includes Vbacking ≤ Vaperture providinges a larger beam compression ratio ~~when Vbacking < Vaperture~~ relative to when Vbacking ≥Vaperture.

21. [Currently amended] The x-ray tube as claimed in claim 15 wherein ~~gridding is accomplished by applying~~ said independent bias includes~~at~~ Vemitter > Vaperture providing a reverse bias.

22. [Original] The x-ray tube as claimed in claim 15 further comprising at least one intermediary electrode member having an aperture defined by the at least one intermediary electrode member, the at least one electrode member disposed between said

cathode front member and said backing, the at least one electrode member configured to flexibly shape the electron beam emitted from the emitter.

23. [Currently amended] A cathode for x-ray tube comprising:

a cathode assembly opposing an anode and spaced apart therefrom, the cathode being maintained during operation of the x-ray tube at a negative potential with respect to the anode, the cathode assembly comprising;

an emitter situated therein for emitting an electron beam to a focal spot on the anode during operation of the x-ray tube,

a cathode front member having an aperture defined by the cathode front member on a first side of the emitter,

a backing disposed on a second side of the emitter and operably connected to the cathode front member via a backing insulator, and

a means for applying a differential bias in the cathode producing a first dipole field between said backing and said aperture defined by said cathode front member immersing said emitter in said first dipole field within said electron beam to variably change the focal spot size.

24. [Original] The cathode as claimed in claim 23 wherein the means include having the cathode front member, and backing being independently biased to shape and accelerate the electron beam and guide the electron beam to the focal spot on the anode.

25. [Currently amended] The cathode as claimed in claim 24 wherein said cathode backing is biased at Vbacking, said aperture of said cathode front member is biased at Vaperture and said emitter is biased at Vemitter, and Vback < Vemitter providinges for a larger beam compression ratio than when Vback ≥Vemitter.

26. [Currently amended] The cathode as claimed in claim 25 wherein Vemitter > Vaperture providing a ~~the means allows for gridding accomplished by~~ reverse bias~~ing when Vemitter > Vaperture~~.

27. [Canceled]

28. [Currently amended] The cathode as claimed in claim 23~~7~~ wherein said emitter is configured to increase electron emission therefrom relative to an emitter having a circular cross section by increasing ~~providing a larger~~ an emissive area of said coiled filament including es at least one of a flattening a portion defining a cross section of said coiled filament~~straight section into a coiled filament~~, ~~increasing the~~ lengthening ~~of~~ said coiled filament and increasing a~~the~~ diameter of said coiled filament.

29. [Original] The cathode as claimed in claim 23 further comprising at least one intermediary electrode member having an aperture defined by the at least one intermediary electrode member, the at least one electrode member disposed between said cathode front member and said backing, the at least one electrode member configured to flexibly shape the electron beam emitted from the emitter.